S.E. IT Sem IV Nov-B 26/11/13

Sub- CM.

Ash3-D:\Data-59

Con. 6307-13. **LJ-10469**

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question **1** is **compulsory**. Attempt any **four** from remaining **six**.
(2) **Figures** in **right** indicate **full** marks.
(3) Statistical **table** can be as per requirement.

1. (a) Two unbiased dice are thrown find expectation of sum. **5**

(b) Find a root of $x^3 - 4x - 9 = 0$ using bisection method in four stages. **5**

(c) A random sample of size 36 has 53 as mean and sum of squares of deviation from mean is 150. Can this sample be regarded as drawn from the population having 54 as mean. **5**

(d) Max $z = x_1 + 3x_2 + 3x_3$ **5**

Subject to $x_1 + 2x_2 + 3x_3 = 4$

$2x_1 + 3x_2 + 5x_3 = 7$

Find all basic solution to the above problem.

2. (a) Using Langrange's interpolation formula to express the function $\frac{3x^2 + x + 2}{(x-1)(x-2)(x-3)}$ as sum of partial fractions. **6**

(b) The probability that a managed 60 will live upto 70 is 0.65. What is the probability that out of 10 such men now at 60 atleast 7 will line upto 70? **6**

(c) The following mistakes per page were observed in a book. **8**

No. of Mistakes per page :	0	1	2	3	4	Total
No. of Pages :	17167	1861	124	2	1	19155

Fit a poisson distribution and test the goodness fit.

3. (a) Find $y_{(5.4)}$ from following table :– **6**

X :	5	6	7	8	9	10	11
Y :	16.25	18.43	19.84	20.70	21.15	21.24	20.98

(b) Ten individuals are chosen at random from population and their heights are found to be **6**
63, 63, 64, 65, 66, 69, 69, 70, 70, 71 inches. Discuss the suggestion that mean height of universe is 65 inches.

TURN OVER

(c) If the probability density function is given by. **8**

$$f(x) = kx^2 (1 - x^3) \qquad 0 \le x \le 1$$
$$= 0 \qquad \text{else where}$$

Find (i) K

(ii) $P(0 < x < \frac{1}{2})$

(iii) $\bar{\chi}$

(iv) $\sigma 2$

4. (a) Express into factorial polynomial the function. **6**
$x^4 - 8x^3 + 18x^2 - 10x$

(b) Using poisson distribution find approximate value of **6**
$300C_2 (0.02)^2 \ (0.98)^{298} + 300C_3 (.02)^3 (.98)^{297}$

(c) Solve following LPP by simplex method :– **8**

$$\text{Max } z = 4x_1 + 2x_2 + 5x_3$$

Subject to $12x_1 + 7x_2 + 9x_3 \le 1260$
$22x_1 + 18x_2 + 16x_3 \le 19008$
$2x_1 + 4x_2 + 3x_3 \le 396$
$x_1, x_2, x_3 \ge 0$

5. (a) The marks obtained by students in a college are normally distributed with mean 65 and variance 25. If 3 students are selected at random from this college what is probability that atleast one of them would have scored more than 75 marks? **6**

(b) Using Newton – Raphson method to solve following equation. **6**
$x^3 + x - 1 = 0$

(c) Fit a second degree parabola to following data and estimate the value of y for $x = 6$ **8**

X :	1	2	3	4	5
Y :	25	28	33	39	46

6. (a) In a sampling a large number of parts manufactured by a machine, the mean number of defective in a sample of 20 is 2 out of 100 such samples, how many would you expect to contain 3 defective. **6**

(i) Using the Binomial distribution.

(ii) Using the Poisson distribution.

(b) If mean of the following distribution is 16. Find m and n and variance :– **6**

X :	8	12	16	20	24
$P(X = x)$:	$\frac{1}{8}$	m	n	$\frac{1}{4}$	$\frac{1}{12}$

(c) Calculate the value of $\int_{0.2}^{1.4}(\sin x - \log_e x + e^x)dx$ by **8**

(i) Simpson's $\left(\frac{3}{8}\right)^{th}$ rule.

(ii) Simpson's $\left(\frac{1}{3}\right)^{rd}$ rule.

(iii) Simpson's $\left(\frac{3}{8}\right)^{th}$ rule.

7. (a) Apply gauss seidal iteration method to solve the equations :– **6**

$20x + y - 2z = 17$

$3x + 20y - z = -18$

$2x - 3y + 20z = 25$

(b) Find mean and variance of Binomial distribution. **6**

(c) Theory predicts that the proportion of beans in the four groups A, B, C, D should be 9:3:3:1. In an experiment among 1600 beans the number in four groups were 882, 313, 287 and 118. Does the experimental result support the theory? **8**
